at least one electrical parameter of the antenna and removing conductive material from at least one of the tracks to bring the monitored parameter nearer to a predetermined value, thereby to increase the inductance of the track, and wherein the monitoring step includes feeding the antenna with a swept frequency signal over a frequency range including the intended operating frequency of the antenna, and monitoring the relative amplitudes of signals in the radiating tracks.

Please add the following new claim.

28. (New) A method according to claim 3, wherein the conductive material is removed from a track portion or portions located on an end surface substantially perpendicular to the cylinder axis.

REMARKS

Claims 1-13 and 20-28 are pending. Claims 14-19 were previously cancelled. Claim 28 is newly presented.

The claims are amended to more clearly define the invention. Claims 1 and 25 have been amended to improve their clarity. Claim 3 is amended to take out the optional feature, which is now made the subject of new Claim 28. Thus, support for new Claim 28 is found in Claim 3 as originally filed. The amendment to the claims does not add new matter.

The specification is amended to explicitly describe, in the detailed description of the preferred embodiments section of the specification, certain embodiments of the invention that were described in Claims 1 and 10-11 as originally filed. Support for the amendment to the specification is also found in the sentence bridging lines 12-13 of page 10; in the second full paragraph of page 11, and at lines 36-37 of page 11, all as originally filed. The amendment to the specification does not add new matter.

The drawings were objected to as failing to comply with 37 C.F.R. 1.84(p)(5) because they do not include a reference sign mentioned in the description.

The Examiner has objected to the drawings as not depicting the plating 20 described at line 21 of page 7. However, the drawings as originally filed already depict the plating 20. Specifically, it is noted that the lower right-hand portion of the cylindrical prism depicted in Figure 1 is labeled with detail numeral 20.

Accordingly, withdrawal of this objection is respectfully requested.

Claims 10-11 were rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, has possession of the invention.

Claims 10 and 11 as presently pending are identical to Claims 10 and 11 as originally filed. It is a well-settled point of law that the subject matter described in the claims of an application as original filed, but not described elsewhere in the application, is considered to be described for the purposes of 35 U.S.C. § 112(1). Claims 10 and 11 are also fully enabled by the specification as originally filed. Specifically, please note that cutting apertures are described in the sentence bridging lines 12-13 of page 10 of the specification as originally filed. Further, computing aperture sizes, etching the apertures in the exposed end face of the antenna, and producing another data set is described in the second full paragraph of page 11 of the specification as originally filed. Furthermore, computing the required aperture size and then laser-controlled etching the apertures is described at lines 36-37 of page 11 of the specification as originally filed. As implicitly suggested by the examiner, the specification is amended to explicitly describe the subject matter of Claims 10-11 by the insertion of paraphrased versions of Claims 10-11 between pages 11 and 12. This amendment to the specification is fully supported by Claims 10-11 as originally filed and by the above-discussed portions of pages 9-11.

Accordingly, withdrawal of this rejection is respectfully requested.

Claims 10-11 and 25-26 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 10 and 25 are amended so as to no longer recite the phrase "the or" before the term "each."

Accordingly, withdrawal of this rejection is respectfully requested.

Claims 1, 3, 12-13 and 25-26 are rejected under 35 U.S.C. § 102(b) as anticipated by Filipovic, et al. (i.e., U.S. Patent No. 5,990,847).

The figures and passages of Filipovic, et al., mentioned by the Examiner merely disclose known quadrifilar helical antennas and refer also to the possibility of tuning a "coupled multi-segment helical antenna" to a given frequency "by adjusting or trimming the length of the radiator segments" (see column 2, lines 29 to 32 of Filipovic). Filipovic is silent as to the affect of adjusting or trimming on the inductance of the segments.

Claims 1 and 25 require removing conductive material from at least one of a plurality of radiating tracks **to increase the inductance of the track** to bring a monitored electrical parameter nearer to a predetermined value. It is important to note that, in general, removing material to reduce the length of radiating tracks reduces their inductance. The claimed invention is not disclosed or suggested by Filipovic because Filipovic is silent as to the inductive affect of adjusting or trimming and one of ordinary skill in the art would expect removing material to reduce the inductance.

Claim 3 is additionally distinguished from Filipovic, et al., by the removal of material from a track portion or portions located on a flat surface of an antenna. The passages referred to by the Examiner do not disclose or suggest removal of track material on a flat surface of an antenna. Therefore, claim 3 is considered to be separately patentable.

With regard to new Claim 28, the remarks made in relation to Claim 3 apply, with the additional distinction that it is from a track portion or portions located on an end surface substantially perpendicular to a cylinder axis from which material is removed to increase inductance. There is no such feature in Filipovic, et al. Therefore, claim 28 is considered to be separately patentable.

With regard to Claims 12 and 13, none of the limitations of (a) feeding the antenna with a swept frequency signal..., (b) monitoring the relative phases and amplitudes of signals in the radiating tracks, and (c) removing conductive material from at least two of the tracks to bring the frequency at which substantial phase or orthogonality occurs closer to the intended operating frequency are disclosed or suggested in the passages of Filipovic, et al., referred to by the Examiner. Indeed, the references to trimming appear to be very general, without reference to monitoring relative phases and amplitudes and removing material to achieve phase orthogonality. Therefore, claims 12 and 13 are considered to be separately patentable.

With regard to Claim 26, Filipovic, et al. does not disclose any step comparable to forming an aperture in a radiating track to increase inductance and to bring a monitored parameter nearer to a predetermined value. The passages referred to by the Examiner merely refer to trimming the length of radiator segments. Therefore, claim 26 is considered to be separately patentable.

Accordingly, withdrawal of this rejection is respectfully requested.

Claim 2 is rejected under 35 U.S.C. § 103 as obvious over Filipovic, et al., in view of Trzaskowski, et al. (i.e., U.S. Patent No. 6,189,201).

Filipovic, et al., fails to disclose the step of removing conductive material from at least one of a plurality of radiating tracks by forming an aperture in the track, leaving the edges of the track intact on either side of the aperture. Consequently, the starting point of the Examiner's obviousness objection is not reached.

Trzaskowski, as discussed in the reply filed November 21, 2001, discloses a planar printed circuit, such as a transmitter or filter network, with discrete lumped elements, such as lumped inductors, which form parts of resonant circuits. These inductors are planar single-turn coils connected by printed tracks to other lumped components, and the internal diameter of the coils is increased by grinding to adjust their respective inductances.

Filipovic's antenna does not include components which are susceptible to adjustment in the way proposed by Trzaskowski. Therefore, one of ordinary skill in the part would not find Trzaskowski's technique indicative of a way of modifying Filipovic's components.

Accordingly, withdrawal of this rejection is respectfully requested.

Claim 4 was rejected under 35 U.S.C. as obvious over Filipovic in view of Ow (i.e., U.S. Patent No. 5,349,365).

Ow does not obviate the above-discussed deficiencies of the Filipovic reference. It may be that the Examiner is referring to the semi-circular slot 34 in the metal disk 28 which forms part of the lower end portion of Ow's radiating structure (see Figures 6, 7 and 10). However, as explained in column 3, lines 56 to 61, of Ow, slot 34 merely allows tab 36 to be pushed up to provide a grounding/solder point for a microstrip balun/impedance transformer 22. This has no relevance to removing conductive material to increase the inductance of a radiating track, this being the material removal step of Claim 1 which is referred to in Claim 4. Ow, et al.'s, slot merely serves a mechanical function in that it allows transformer 22 to pass through disk 28.

Accordingly, withdrawal of this rejection is respectfully requested.

At page 1, item 5, and page 5, paragraph 12, the Examiner explicitly indicates that Claims 5-9, 20-24 and 27 are allowed. This indication of allowed subject matter is very much appreciated.

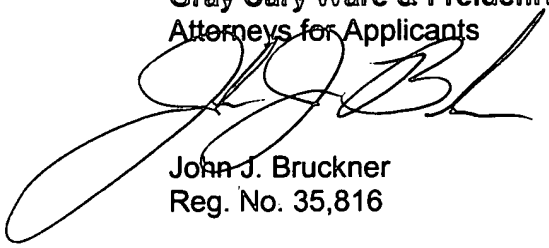
Other than as explicitly set forth above, this reply does not include acquiescence to statements by the Examiner. In view of the above, all of the claims are considered patentable and allowance of all of the claims is respectfully requested. In the event that there are any remaining issues, the attending to of which would expedite the allowance of this application, the Examiner is invited to contact the undersigned for promptly action at the direct line telephone number appearing below.

An extension of two (2) months is requested and a Notification of Extension of Time Under 37 C.F.R. § 1.136 with the appropriate fee is attached hereto.

The Commissioner is hereby authorized to charge any fees or credit any overpayments to Deposit Account No. 50-0456 of Gray Cary Ware & Freidenrich, LLP.

Respectfully submitted,

Gray Cary Ware & Freidenrich LLP
Attorneys for Applicants



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VERSION WITH MARKINGS TO SHOW CHANGES MADE

PURSUANT TO 37 CFR 1.111

APPENDIX 1

IN THE SPECIFICATION:

Please insert the following paragraph between pages 11 and 12:

The invention can include a method of producing a quadrifilar antenna for circularly polarised radiation at frequencies above 200 MHz, the antenna comprising a plurality of substantially helical conductive radiating tracks located on an electrically insulative substrate, wherein the method comprises monitoring at least one electrical parameter of the antenna and removing conductive material from at least one of the tracks to increase the inductance of the track and thereby to bring the monitored parameter nearer to a predetermined value, wherein material is removed from the tracks by forming a rectangular aperture in each affected track, the aperture having a predetermined width transverse to the direction of the track which is computed automatically in response to the result of the monitoring step. In an embodiment of this method, the width and length of the aperture are variable in response to the said monitoring result.

IN THE CLAIMS:

1. (Amended) A method of producing a quadrifilar antenna for circularly polarised radiation at frequencies above 200 MHz, the antenna comprising a plurality of substantially helical conductive radiating tracks located on an electrically insulative substrate, wherein the method comprises monitoring at least one electrical parameter of the antenna and removing conductive material from at least one of the tracks to increase the inductance of the track and

thereby to bring the monitored parameter nearer to a predetermined value[, thereby to increase the inductance of the track].

2. A method according to claim 1, wherein the conductive material is removed from the track by laser etching an aperture in the track, leaving the edges of the track intact on either side of the aperture.

3. (Amended) A method according to claim 1 for producing an antenna in which the substrate is substantially cylindrical and the tracks include portions on a cylindrical surface of the substrate and a flat surface of the substrate,[e.g., an end surface substantially perpendicular to the cylinder axis,] wherein the conductive material is removed from a track portion or portions located on the flat surface.

4. A method according to claim 1 for producing an antenna having a plurality of helical track portions located in a substantially cylindrical substrate surface, and a plurality of respective connecting track portions located on a substantially flat end surface of the substrate to connect the helical track portions to an axial feeder, wherein the material removal step comprises forming a cut-out in at least one of the connecting track portions.

5. A method of producing a quadrifilar antenna for circularly polarised radiation at frequencies above 200 MHz, the antenna comprising a plurality of substantially helical conductive radiating tracks located on an electrically insulative substrate, wherein the method comprises monitoring at least one electrical parameter of the antenna and removing conductive material from at least one of the tracks to bring the monitored parameter nearer to a predetermined value, thereby to increase the inductance of the track,

wherein the monitoring step comprises coupling the antenna to a radio frequency source, bringing probes into juxtaposition with the tracks at predetermined locations, and measuring at least the relative phases of signals picked up by the probes associated with different respective tracks when the radio frequency is operated.

6. A method according to claim 5, wherein the probes are capacitively coupled to the respective tracks.

7. A method according to claim 5, wherein the probes are located in registry with track portions corresponding to the positions of voltage minima when the radio frequency source is tuned to the intended operating frequency of the antenna.

8. A method according to claim 5, wherein the probes are located in registry with end portions of the helical tracks.

9. A method according to claim 5 for producing an antenna in which each track has a first end portion adjacent a feed location and a second, opposite end portion spaced from the said feed location, wherein the material removal step comprises forming cut-outs in the first end portions and the monitoring step includes positioning the probes in juxtaposition with the second end portions.

10. (Amended) A method according to claim 1, wherein material is removed from the tracks by forming a rectangular aperture in[the or] each affected track, the aperture having a predetermined width transverse to the direction of the track which is computed automatically in response to the result of the monitoring step.

11. A method according to claim 10, wherein with the width and length of the aperture are variable in response to the said monitoring result.

12. A method according to claim 1, wherein the monitoring step includes feeding the antenna with a swept frequency signal over a frequency range including the intended operating frequency of the antenna, monitoring the relative phases and amplitudes of signals in the radiating tracks, and removing conductive material from at least two of the tracks to bring the

frequency at which substantial phase orthogonality occurs closer to the intended operating frequency.

13. A method according to claim 1, wherein the monitoring step includes feeding the antenna with a swept frequency signal over a frequency range including the intended operating frequency of the antenna, monitoring the relative phases and amplitudes of signals in the radiating tracks to bring the difference between the monitored phases at a central resonant frequency nearer to 90°.

20. A method of producing a quadrifilar antenna for circularly polarised radiation at frequencies above 200MHz, the antenna comprising a plurality of helical conductive radiating tracks located on an electrically insulative substrate, wherein the method comprises monitoring at least one electrical parameter of the antenna and removing conductive material from at least one of the tracks to bring the monitored parameter nearer to a predetermined value, thereby to increase the inductance of the track, and wherein the monitoring step comprises coupling the antenna to a radio frequency source, bringing probes into juxtaposition with the tracks at predetermined locations, and measuring at least the relative amplitudes of radio frequency signals picked up by the probes associated with different respective tracks when the radio frequency source is operated.

21. A method according to claim 20, wherein the probes are capacitively coupled to the respective tracks.

22. A method according to claim 20, wherein the probes are located in registry with track portions corresponding to the positions of voltage minima when the radio frequency source is tuned to the intended operating frequency of the antenna.

23. A method according to claim 20, wherein the probes are located in registry with end portions of the helical tracks.

24. A method according to claim 20, wherein the material removal step comprises forming cut-outs in the first end portions and the monitoring step includes positioning the probes in juxtaposition with the second end portions.

25. (Amended) A method of producing a quadrifilar antenna for circularly polarised radiation at frequencies above 200 MHz, the antenna comprising a plurality of helical conductive radiating tracks located on an electrically insulative substrate, wherein the method comprises monitoring at least one electrical parameter of the antenna and removing conductive material from at least one of the tracks to form an aperture in[the or] each affected track to increase the inductance of the track and thereby to bring the monitored parameter nearer to a predetermined value[, thereby to increase the inductance of the track].

26. A method according to claim 25, wherein the aperture is rectangular.

27. A method of producing a quadrifilar antenna for circularly polarised radiation at frequencies above 200 MHz, the antenna comprising a plurality of helical conductive radiating tracks located on an electrically insulative substrate, wherein the method comprises monitoring at least one electrical parameter of the antenna and removing conductive material from at least one of the tracks to bring the monitored parameter nearer to a predetermined value, thereby to increase the inductance of the track, and wherein the monitoring step includes feeding the antenna with a swept frequency signal over a frequency range including the intended operating frequency of the antenna, and monitoring the relative amplitudes of signals in the radiating tracks.

28. (New) A method according to claim 3, wherein the conductive material is removed from a track portion or portions located on an end surface substantially perpendicular to the cylinder axis.